Study of Logistics Management of Iron and Steel Enterprises Based on Multimodal Transport—Take M Company as an Example

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Abstract: Taking M steel logistics company as the research objective, and aiming at the problems existing in the enterprise, this paper makes the analysis of the external environment and resource capacity, schedules the strategic transformation plan of multimodal transportation, and designs the multimodal transport logistics service platform framework, which has a "vertical and horizontal" structure, and is able to guarantee the unified management of the group vertically and connect several transport departments horizontally. Through the effective circulation of information, the cost can be reduced, and the operation efficiency and comprehensive benefits of enterprises can be improved. This paper discusses the intermodal transport and integrated services of various modes of transport, and puts forward specific measures and schemes of multimodal transport services from eight aspects, which can not only optimize the transport rate of production logistics internally, but also obtain certain profits through services to the third parties.

Introduction

At present, the steel industry's production capacity continues to rise, exports decline significantly, the prejudice of public opinion and other phenomena have a great impact on the steel industry, enterprises have begun to look for new profit points, many steel logistics enterprises to the flow of steel processing and distribution and other logistics business areas.

M group took this opportunity to seek change and innovation, through reorganization and integration, the establishment of a new M logistics company. At present, the foundation is still very weak, business integration is still taking time, the overall competitiveness is not strong. However, relying on good location conditions and group scale resources, logistics industry has a relative competitive advantage and a large space for future development. As the logistics guarantee link of M group, most of its business is to guarantee production and supply for M company. From the external operating market caliber to statistics internal ratio up to 80%, external ratio is quite small. With the development of market economy, the internal service of M company is far from satisfying the development needs. The logistics company of M company is in urgent need of transformation and upgrading to explore new profit points.

Status Analysis of M Company

The development of M company largely depends on whether it can accurately and timely grasp the changes of the environment and controls the internal resources accurately. Therefore, PEST analysis, capability and resource analysis and other analytical methods are used in this paper to clarify M company's current development status and macro environment [1].

Analysis of External Environment

The external environment analysis is mainly based on PEST analysis, which analyzes the political, economic, social, technical and other factors in the domestic macro environment from the perspective of company development [2-4]. PEST analysis results are shown in Fig. 1.
Figure 1. PEST Analysis of M Company.

**Political Analysis**
- The state has issued many policies for multimodal transport since 2016
- M company is supported by national projects

**Economical Analysis**
- National economy shows rising trend
- Highway transport takes main part in domestic logistic

**Technical Analysis**
- Promotion of multimodal transport mode
- Unmanned technology development

**Social Analysis**
- Emphasis is placed on green development in social development
- Public has high pollution bias against steel enterprises

Figure 2. Analysis of the Ability and Resources of M Company.

**Analysis of Internal Environment**

The environment analysis is definitely significant for the system design [5,6].

**Financial resource analysis**
- Own total assets of 169 million and net assets of 114 million.

**Material resource analysis**
- Storage resources: Own 200 warehouses with the total 21 million tons storage volume
- Transportation resources: 500 motor vehicles; 8 cargo ships of over 10,000 tons

**Core competence**
- Financial advantage
- Comprehensive facilities
- Value-added services
- International freight forwarders

**Core customer and core business analysis**
- M group's own steel transportation business
- Wu Bao group Transport imports
- Sinopec Coal and building materials business
- Food enterprises

**Human resource capability analysis**
- A total of more than 10,000 employees.

For the internal environment of M company, this paper mainly analyzed the financial resources, material resources, human resources, core customer base, and core competitiveness of M company. The results of capability resource analysis are shown in Fig 2.
Multimodal Transport Scheme to Get out of the Dilemma

It is necessary to analyze the current situation before the system design, so as to find some scientific thinking and support for the scheduling [7,8].

M Company’s Current Difficult Position

M Company’s Market Customer Structure is Faced with Transition. In the past, M company mainly appeared as the logistics guarantee link of M company group, and its main business was to guarantee production and supply for the headquarters of M company. According to the statistics from the external operating market amount, in 2017, its internal business accounted for 80%, the net business development of non-M companies accounted for 20%, and the external business accounted for quite a small proportion. However, with the development of market economy, the internal services mainly provided by M company are far from meeting the development needs of M company. M company urgently needs to transform from its own logistics to a professional third-party logistics enterprise.

M Company’s Operation Mode and Structure are Facing Transformation. In the past, M company was positioned as the logistics guarantee link of M company group. All business objectives were to guarantee the production of the parent company, and we did not pay attention to the development of social logistics business, which resulted in abnormal development. External business only accounts for 20% of the total business, and the main source of business is the head office partner. M company also has many subsidiaries, which are responsible for separate sections. Information flow among subsidiaries is not smooth, cross-type transportation is difficult to connect, document handover is difficult, and transportation efficiency is low. In order to solve these problems, M company must change its operation mode from traditional managed logistics to operational logistics.

The Service Objects of M Company are Facing Big Changing. As xi general secretary proposed "ecological priority, green development, adhere to place priority on the ecological environment protection, total catch big protection, no big development" of the Yangtze river development principles, the relevant state departments have strengthened the rectification of the Yangtze river coast ports, the Yangtze river economic belt series management actions, such as the water source of drinking water regulation banned the nearly one thousand terminals in the Yangtze river, close follow-up will also focus on inland river wharf renovation. For M company selling water transport logistics, national comprehensive improvement of inland terminals will result in a certain period wall wharf resources nervous, the port of destination port, steel is not delivery in time and a series of serious problems, which causes the difficulty in distribution logistics shipping delivery, product backlog serious when, will endanger the normal production organization of M company."

The above analysis points out the dilemma of M company's single transportation category, weak profitability, low transportation efficiency, and disordered organizational structure. Moreover, M company is in urgent need of a new operating system and a scientific and feasible new operating platform that can reduce costs and improve organizational efficiency. Therefore, multimodal transport is the key for M company to get rid of the current dilemma and realize the transformation.

Key to Solve the Dilemma -- Multimodal Transport

The overview of logistics information platform based on multimodal transport is as follow:

Strategic Analysis. Railway logistics transportation has some advantages of large capacity, fast transportation speed, high transportation safety, and less affected by natural environmental changes [9]. At the same time, in the case of mass transportation, railway transportation has obvious advantage on service charges, and transportation timeliness than automobile transportation [10]. Therefore, M company's railway logistics port can take advantage of geographical environment to develop container multimodal transport which has great advantages and development prospects [11-13]. Multimodal transport can give full play to the advantages of various modes of transport, and achieve comprehensive results to improve transport efficiency [14,15]. The development of
multimodal transport in M company's railway logistics port can also provide experience and model for the development of multimodal transport, and become a model of multimodal transport in China.

**Target Positioning.** M railway logistics port taking Railway Container Transportation as the Core, developing new type logistics of iron and steel railway and container multimodal transport facing the third party and M company group, flexibly using national policy support, develop and improve the functions of Railway Logistics Port, developing the logistics services other than railway logistic transportation, such as warehousing services, container services, other value-added services and others, so as to meet customer needs and keep pace with the development of the era.

**Design Objectives.** The important component of this project is the railway logistics port. Besides built the railway container handling line, the goods vehicle handling line and the wet goods operation area, having a series of functions such as handling, warehousing, sorting, circulating and processing, it will also have the ability of market transaction, and at provide special products and services for the society, such as cold chain logistics services for food enterprises. At the meantime, it will integrates the existing mature logistics technology in all aspects, take advantages of information classification technology, bar code technology, radio frequency identification technology, electronic data exchange technology and other information technologies to realize digital warehouse, digital factory, unmanned warehouse, unmanned bicycle, unmanned loading and unloading, intelligent factory.

**Design Principles.** The platform will be built based both on the principles of perfecting and increasing the functions and services of M company's railway logistics port, improving the operation efficiency of M company's railway logistics port, and improving the quality of customer service, and on the national multimodal transport policy and the green environmental protection transport policy, so as to making the platform a long-term, efficient and stable logistics service Platform.

**Design Ideas.** Based on the fact that the construction project of M company's multimodal transport railway logistics port has been basically determined. Firstly, the information transfer and collaborative work flow among the internal subsidiaries should be optimized to ensure the efficient operation of the multimodal transport port. Secondly, more attention should be paid to the use of new technologies to improve the service quality of the logistics port, improve the work efficiency of the whole logistics port, and reduce the operation cost of the logistics port. Third, attentions should also be paid to build value-added services, such as the construction of large express logistics transfer base in ma'anshan and the development of M company's steel products storage business.

**Frame Work.** The key to steady the operation of M company's Railway Logistics Port is rely on a solid and reliable information platform to coordinate the assignment of tasks. Therefore, according to the actual situation of M company's railway logistics port, this paper designs the whole logistics service platform based on multimodal transport. The platform includes three core services, customer service system, collaboration service system, logistics supervision system and three auxiliary systems, supervisory service system, electronic financial transaction and document interactive system and Data analysis and decision support system to ensure the normal operation of Physical Logistics and the operation of third-party business with low cost and high profit [16].

Fig. 3 is the framework of multimodal transport logistics service platform of M company designed in this paper.

**Design of Logistics Platform Function Service Based on Multimodal Transport**

The content of platform service is based on the establishment of railway logistics port facilities [17,18]. Services mainly includes four service directions: intermodal and integrated services of various modes of transport, warehousing and delivery services, documents and information services, and value-added services based on containers [19]. Fig. 4 shows the functional design of M company's multimodal transport platform.
Multimodal Transport and Comprehensive Services

Changing the Mode of Transport of Raw Materials. M Company's change the raw material service from bulk shift to container transport and the waterway transport to railway transport. The blast furnace of M company needs more than 40 million tons of raw materials containing iron, coal, coke, auxiliary materials and other raw materials for combustion, including 24 million tons of iron materials per year, 17 million tons of imported ore (ore containing blocks) per year by water
transportation, and 7 million tons of domestic and self-produced ore by water transportation, iron transportation and automobile transportation. About 10 million tons of coal per year, most of which arrived by railway, and a small amount was replenished by water transportation. The auxiliary materials are about 4 million tons/year, most of which are transported by water.

Raw materials for blast furnace ironmaking are transported in bulk. While port logistics can provide Bulk to Container service, based on different raw materials to set up a large number of special container for M company raw material change sets, can improve the transportation efficiency of the original bulk carrier, reach green transportation.

Shipping in the raw material transport capacity reached more than 2000 ten thousand tons/year. Due to the implementation of the national Yangtze River regulation policy, the shipping volume of the Yangtze River will be greatly reduced. Therefore, the transformation of waterway transport to railway transport will become an effective method to reduce costs and increase efficiency for the enterprises relying on inland river transportation.

**Container Transportation Service for Steel Products of M Company.** M company's steel products amount to 14.5 million tons per year, mainly including plates and belts, profiles, wires and axles, etc., which are shipped to the market by various means of transportation, including 6 million tons per year of water transportation, 1.5 million tons per year of iron transportation and 7 million tons per year of automobile transportation. Export steel products can be transported by train in the form of containers. Suitable size products such as strips, profiles, wires and axles can be transported through containers, which greatly increases the proportion of railway transportation and reduces the proportion of automobile transportation and water transportation.

**Cold Chain Railway Container Transport Service.** Mengniu, Yurun dairy products, food manufacturers are built or under construction in Ma on Shan area high yield large factories, construction of Mengniu ice cream production workshop has Asia's largest single span about 26 production lines, production, the main sales direction of Su-Xi-Chang Hangzhou region, M company can establish cooperation relations with railway logistics port, play speed of railway transportation capacity is big, the advantage of trucks freight relatively cheap to carry out the service, provide special container, opened up an express train to ensure transportation product freshness; Railway logistics ports can not only obtain relatively stable income, but also obtain additional income due to the special service of providing cold chain containers and express trains [20].

**Low Humidity Society Container Combined Transport Service.** In the course of combined transportation, M company still cannot ignore the advantages such as reducing the damage rate and improving the speed of transportation by using the Low humidity operation area owned by the railway logistics port of M company to provide special storage and transportation services for some special goods in social containers, such as paper, food and chemical products.

**General Social Container Transportation Service.** With the development of paper making, chemical industry, electronics and electric appliances, auto parts and other industries in Maanshan city, and the continuous improvement of infrastructure conditions, the growth potential of container transportation demand is great. For example, Anhui Shanying Paper Co., Ltd. has developed an annual paper production capacity of 800,000 tons/year and an annual production capacity of 500 million square meters/year of corrugated cardboard cartons. The railway transportation of paper products benefits from the high safety factor of container railway transportation, and the cargo loss rate will be reduced. Railway logistics port can provide flexible transportation service according to enterprise demand.

**Container Service at Railway Logistics Ports.** The module is the responsibility of the established container company. Set up a group of special containers specially used for raw material transportation of M company to meet the demand of raw material transportation containers of M company; At the same time, a certain amount of frame containers are provided to transport M company's large steel products. There are a considerable number of refrigerated containers or insulated containers with refrigerated transport function to meet the requirements of Mengniu, Yurun and other dairy food manufacturers; In addition, a large number of grocery containers (20ft
and 40ft) should be provided or shared with other container companies to meet the transportation needs of basic goods. We also provide container consolidation service to meet the customers' demand that the freight volume is not enough to fill the whole container. Meanwhile, we also improve the utilization rate of containers and freight volume.

**Logistics Finance.** Use of M company have the third party logistics railway logistics port, by means of M company has strong capital resources for reasonable application and development of a variety of financial products, to effectively organize and adjust in the field of logistics monetary fund movement in order to improve the level of enterprise integration services, improve the competitive ability of enterprise, improve the business scale of enterprises, increase the high value-added service function, expand enterprise's operating profit [21].

**Special Cargo Transportation Service.** Transportation of special goods requires high requirements on spare parts, speed and time of logistics enterprises. The M company happens to have the qualification of special transportation and sufficient transportation capacity. Combined with the cargo transportation requirements provided by this project, it can generate a large amount of revenue.

**Other Functions of the Multimodal Transport Logistics Service Platform**

In addition to the aforementioned multimodal transport and comprehensive services, the platform can also provide warehousing services, including steel products warehousing service, cold storage service, humidity sensitive goods storage service, large express transfer service, and futures delivery warehouse service.

At the same time, the platform also has documents and information services, container-based value-added services and other functions, providing a full guarantee for the realization of M company's multimodal transport function.

**Conclusion**

Based on the internal and external environment of M company, this paper analyzes the existing difficulties of M company, proposes the logistics management scheme based on multimodal transport, and completes the research work in the following aspects:

This paper puts forward the transformation direction of multimodal transport mode based on M company. The number of internal subsidiaries of M company is large, the information flow between companies is not smooth, a large number of transportation resources are idle, and there are great difficulties in the management of M group. Therefore, the solution is to build Multimodal transportation system to solve internal communication difficulties and increase profits through the use of the surplus capacity of third-party logistics by building a multimodal transport information exchange platform [22].

This paper designed a multimodal transport information platform based on the current situation of M company. The establishment of "multimodal transport information platform" based on "vertical" can optimize the procurement, production, sales, logistics and warehousing activities of M group's steel business, reduce information distortion and increase business profit. "Transversely" connects different transport sectors, efficiently coordinates the connection between different transport modes, and matches the transport capacity, laying the foundation for the good operation of multimodal transport mode. And to a certain extent to solve the problem of blocking the information exchange between the subsidiaries of M company.

This paper designed a multimodal transport service based on M company's railway logistics port. Since 80% of the services of M Logistics Company are only for the production logistics of M company group. The functions of the facilities built by M Company are not completely explored. Therefore, this paper designs a multimodal transport service based on M company's railway logistics port, which can not only optimize the transport rate of production logistics internally, but also gain a certain profit through third-party services.
References


